CLAIMS

1. A data processing method for determining record data allocation on an information recording medium having a plurality of recording layers, the method characterized by having:

an allowable jump range determining step of determining an allowable range of an intra-layer jump and an inter-layer jump performed in a playback processing of said information recording medium;

a required jump time calculating step of calculating a required time for the intra-layer jump and the inter-layer jump on the basis of allowable jump range information determined in said allowable jump range determining step; and

a consecutive data allocation size determining step of determining an allowable minimum consecutive data size of data to be stored in the information recording medium on the basis of the required jump time calculated in said required jump time calculating step.

2. The data processing method as claimed in Claim 1, characterized in that:

said required jump time calculation step is a step of calculating:

as to an intra-layer jump, a sum of a seek time of a pickup and an overhead time involved in a processing for a read data unit block of the information recording medium, and

as to an inter-layer jump, a sum of the seek time of the pickup, a pickup adjustment time involved in

an inter-layer seek, and an overhead time involved in a processing for a read data unit block of said information recording medium.

3. The data processing method as claimed in Claim 1, characterized in that:

said consecutive data allocation size determining step is a step including an allowable minimum playback time determining step of determining an allowable minimum playback time as a playback time corresponding to the allowable minimum consecutive data size of the data to be stored in the information recording medium, and determining the allowable minimum consecutive data size of the data to be stored in the information recording medium on the basis of said allowable minimum playback time.

3. The data processing method as claimed in Claim 3, characterized in that:

said allowable minimum playback time determining step is a step of calculating the allowable minimum playback time [t] on the basis of a jump time [TJUMP], a data read out rate [Rud] from a disc in a drive and a data recording rate [RTS] in accordance with the following equation:

$$t = TJUMP \times Rud/(Rud-RTS);$$ and

said consecutive data allocation size determining step is a step of determining the allowable minimum consecutive data size of the data to be stored in the information recording medium on the basis of the allowable minimum playback time [t] calculated by said

equation in accordance with the following equation:

$$Usize = t \times RTS.$$

5. The data processing method as claimed in Claim 1, characterized by further having:

a data setting processing step of identifying jump origin data and jump destination data that can be generated in the playback processing of the stored data in the information recording medium and setting a distance between the jump origin data and the jump destination data within the allowable jump range determined in said allowable jump range determining step on the basis of the identification information.

6. The data processing method as claimed in Claim 5, characterized in that:

said data setting processing step carries out a processing of setting the distance between the jump origin data and the jump destination data within said allowable jump range by an interleave processing of clip data set as a data unit of storage target data on the information recording medium.

7. The data processing method as claimed in Claim 1, characterized by further having:

a data recording step of performing data recording on the information recording medium in a data unit larger than or equal to the consecutive data allocation size determined in said consecutive data allocation size determining step.

8. A data processing apparatus for determining record data allocation on an information recording medium having a plurality of recording layers, said apparatus characterized by having:

allowable jump range determining means that determines an allowable range of an intra-layer jump and an inter-layer jump performed in a playback processing of said information recording medium;

required jump time calculating means that calculates a required time for the intra-layer jump and the inter-layer jump on the basis of allowable jump range information determined by said allowable jump range determining means; and

consecutive data allocation size determining means that determines an allowable minimum consecutive data size of data to be stored in the information recording medium on the basis of the required jump time calculated by said required jump time calculating means.

9. The data processing apparatus as claimed in Claim 8, characterized in that:

said required jump time calculating means calculates:

as to an intra-layer jump, a sum of a seek time of a pickup and an overhead time involved in a processing for a read out data unit block of the information recording medium, and

as to an inter-layer jump, a sum of the seek time of the pickup, a pickup adjustment time involved in an inter-layer seek, and an overhead time involved in a processing for a read out data unit block of said

information recording medium.

10. The data processing apparatus as claimed in Claim 8, characterized in that:

said data processing apparatus further includes allowable minimum playback time determining means that determines an allowable minimum playback time as a playback time corresponding to the allowable minimum consecutive data size of the data to be stored in the information recording medium, and

said consecutive data allocation size determining means is configured to determine the allowable minimum consecutive data size of the data to be stored in the information recording medium on the basis of said allowable minimum playback time.

11. The data processing apparatus as claimed in Claim 10, characterized in that:

said allowable minimum playback time determining means is configured to calculate the allowable minimum playback time [t] on the basis of a jump time [TJUMP], a data read out rate [Rud] from a disc in a drive and a data recording rate [RTS] in accordance with the following equation:

$t = TJUMP \times Rud/(Rud-RTS)$; and

said consecutive data allocation size determining means is configured to determine the allowable minimum consecutive data size of the data to be stored in the information recording medium on the basis of the allowable minimum playback time [t] calculated by said equation in accordance with the following equation:

Usize = t × RTS.

12. The data processing apparatus as claimed in Claim 8, characterized in that:

said data processing apparatus further has data setting processing means that identifies jump origin data and jump destination data that can be generated in the playback processing of the stored data in the information recording medium and sets a distance between the jump origin data and the jump destination data within the allowable jump range determined in the said allowable jump range determining means on the basis of the identification information.

13. The data processing apparatus as claimed in Claim 12, characterized in that:

said data setting processing means is configured to carry out a processing of setting the distance between the jump origin data and the jump destination data within said allowable jump range by an interleave processing of clip data set as a data unit of storage target data on the information recording medium.

14. The data processing apparatus as claimed in Claim 8, characterized in that:

said data processing apparatus further has data recording means that performs data recording on the information recording medium in a data unit larger than or equal to the consecutive data allocation size determined in said consecutive data allocation size determining step.

15. An information recording medium having a plurality of recording layers, characterized by having:

a configuration storing therein data larger than or equal to an allowable minimum consecutive data size determined on the basis of a required jump time of an intra-layer jump and an inter-layer jump executed in a playback processing of the information recording medium.

16. The information recording medium as claimed in Claim 15, characterized in that:

said required jump time is:

as to an intra-layer jump, a sum of a seek time of a pickup and an overhead time involved in a processing for a read out data unit block of the information recording medium, and

as to an inter-layer jump, a sum of the seek time of the pickup, a pickup adjustment time involved in an inter-layer seek, and an overhead time involved in a processing for a read out data unit block of said information recording medium.

17. The information recording medium as claimed in Claim 15, characterized in that:

said allowable minimum consecutive data is a size determined on the basis of an allowable minimum playback time as a playback time corresponding the allowable minimum consecutive data size of the data to be stored in the information recording medium.

18. The information recording medium as claimed in

Claim 15, characterized in that:

said information recording medium further has data allocation of setting a distance between jump origin data and jump destination data in a jump processing that can be generated in a playback processing of the stored data of the information recording medium within an allowable jump range.

19. The information recording medium as claimed in Claim 18, characterized in that:

said information recording medium further has data allocation in which the distance between the jump origin data and the jump destination data is set within said allowable jump range by an interleave processing of clip data set as a data unit of storage target data on the information recording medium.

20. A computer program for executing a data processing for determining record data allocation on an information recording medium having a plurality of recording layers, said computer program characterized by having:

an allowable jump range determining step of determining an allowable range of an intra-layer jump and an inter-layer jump performed in a playback processing of said information recording medium;

a required jump time calculating step of calculating a required time for the intra-layer jump and the inter-layer jump on the basis of allowable jump range information determined in said allowable jump range determining step; and

a consecutive data allocation size determining step

of determining an allowable minimum consecutive data size of data to be stored in the information recording medium on the basis of the required jump time calculated in said required jump time calculating step.

21. A data processing method for determining record data allocation on an information recording medium, said method characterized by having:

a data size determining step of determining a data size as a minimum size of data to be stored in the information recording medium on the basis of allowable jump range information determined as an allowable range of a jump processing in a playback processing of said information recording medium; and

a data allocation determining step of determining a data recording configuration in which a data block having said data size is so allocated as to be playable in the jump processing within said allowable jump range.

22. The data processing method as claimed in Claim 21, characterized in that:

said data size determining step is a step of determining a data size as a minimum size of data to be stored in the information recording medium on the basis of the allowable jump range information of an intra-layer jump and an inter-layer jump.

23. The data processing method as claimed in Claim 21, characterized in that:

said data size determining step is a step of determining a data size on the basis of a table in which

a data recording rate [RTS] is made corresponding to the allowable minimum data size of the data to be stored in the information recording medium.

24. The data processing method as claimed in Claim 21, characterized in that:

said data size determining step is a step of determining a data size on the basis of a relational expression between a data recording rate [RTS] and the allowable minimum data size of the data to be stored in the information recording medium.

25. The data processing method as claimed in Claim 24, characterized in that:

said relational expression is an expression shown by the following equation:

$$S_{EXTENT}[byte] \geq \frac{T_{JUMP}[ms] \times R_{UD}[bps]}{1000 \times 8} \times \frac{TS\_recording\_rate[bps] \times 192}{R_{UD}[bps] \times 188 - TS\_recording\_rate[bps] \times 192},$$

setting that an allowable minimum data size of the data to be stored in the information recording medium is S_{EXTENT}, a total jump time is T_{JUMP}, a data read out rate from a disc in a drive is R_{ud}, and a data recording rate [RTS] is $TS_{recording\ rate}$.

26. A data processing apparatus for determining record data allocation on an information recording medium, said apparatus characterized by having:

a data size determining apparatus that determines a data size as a minimum size of data to be stored in the information recording medium on the basis of allowable jump range information determined as an allowable range

of a jump processing in a playback processing of said information recording medium; and

a data allocation determining apparatus that determines a data recording structure in which a data block having said data size is so allocated as to be playable in the jump processing within said allowable jump range.

27. The data processing apparatus as claimed in Claim 26, characterized in that:

said data size determining means is configured to determine a data size as a minimum size of data to be stored in the information recording medium on the basis of the allowable jump range information of an intra-layer jump and an inter-layer jump.

28. The data processing apparatus as claimed in Claim 26, characterized in that:

said data size determining apparatus is configured to determine a data size on the basis of a table in which a data recording rate [RTS] is made corresponding to the allowable minimum data size of the data to be stored in the information recording medium.

29. The data processing apparatus as claimed in Claim 26, characterized in that:

said data size determining apparatus is configured to determine a data size on the basis of a relational expression between a data recording rate [RTS] and the allowable minimum data size of the data to be stored in the information recording medium.

30. The data processing apparatus as claimed in Claim 29, characterized in that:

said relational expression is an expression shown by the following equation:

$$S_{EXTENT}[byte] \geq \frac{T_{JUMP}[ms] \times R_{UD}[bps]}{1000 \times 8} \times \frac{TS\_recording\_rate[bps] \times 192}{R_{UD}[bps] \times 188 - TS\_recording\_rate[bps] \times 192},$$

setting that an allowable minimum data size of the data to be stored in the information recording medium is S_{EXTENT}, a total jump time is T_{JUMP}, a data read out rate from a disc in a drive is R_{ud}, and a data recording rate [RTS] is $TS_{recording\ rate}$.

31. A computer program for executing a record data allocation determining processing on an information recording medium, said computer program characterized by having:

a data size determining step of determining a data size as a minimum size of data to be stored in the information recording medium on the basis of allowable jump range information determined as an allowable range of a jump processing in a playback processing of said information recording medium; and

a data allocation determining step of determining a data recording structure in which a data block having said data size is so allocated as to be playable in the jump processing within said allowable jump range.